COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Science
ACADEMIC UNIT	Physics
LEVEL OF STUDIES	Undergraduate
COURSE CODE	**10YKO13** **SEMESTER** 1
COURSE TITLE	**THEORY OF PROBABILITIES**

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures (theory and exercises)	4	6

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General background
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes,in the English language for Erasmus students
COURSE WEBSITE (URL)	https://eclass.uoa.gr/courses/PHYS369/

(2) LEARNING OUTCOMES

In this course the student acquires the necessary knowledge to understand the basic theory of probabilities. In relation to physical problems, the basic analytic and computational methodologies are introduced in order to solve probability problems

With the completion of the course the student is able to:
- Describe and relates the theoretical distributions with specific problems
- Interpret the results derived from the application of statistical methods
- Estimate the expectation value of random variables that depend on measurable quanities
- Develop analytical/computational method to solve physical problems
- Evaluate and compare the results derived from different methods

The course aims at the following general competences

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Working in an international environment
Working in an interdisciplinary environment
Project planning and management
Criticism and self-criticism
Production of free, creative and inductive thinking
Analytical and synthetic thinking
Critical thinking
Time management
Taking initiative/responsibility
New Technology skills
Creativity
Information management
Flexibility / Adaptability
Problem solving

(3) SYLLABUS

- Combinatorics. Stirling formula.
- Axiomatic definition of the Theory of Probabilities. Independence. Conditional probability. Bayes theorem.
- Discrete random variables. Continuous random variables.
- Random walks. Diffusion as a random walk.
- Estimation of random variable – Minimum average square error.
- Weak law of large numbers. Central limit Theorem.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Yes Electronic communication with the students using ICT (Information and Communications Technology) Computer-aided lectures, use of Overhead Projectors, Eclass platform

TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	Activity	Semester workload
	Lectures	27
	Exercises	25
	Seminars	
	Individual Study/Study and Analysis of bibliography / Preparation	96
	Exams	2
	CourseTotal	**150**

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Final written exams in Greek using problem solving and open ended questions Oral exams when it is required.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography

- Introduction to Probabilities and Statistics , C. Damianos, N. Papadatos, C.. Charalabidis, 2010, Symmetria Publisher
- Lessons of Applied Statistics, Livada I and D. Asimakopoulos, 2010, Athanasopoulos Publisher
- Elements of Probabilties with emphasis on statistics and informatics, J. Kontogiannis and S. Toubis, 2015, Heallink
- Probabilities and Statistics for engineers, Milonas N. and Papadopoulos V., 2017, Tziola Publisher